

Study programme(s):PhD in Environmental Protection			
Level: PhD studies			
Course title: Environmental Quality Control (advanced course)		Subject code: DZZS-605	
Lecturer(s): Dr Ivana Ivančev-Tumbas			
Status: elective			
ECTS: 15			
Requirements: none			
Learning objectives To enhance the knowledge in the field of environmental quality assessment and quality control.			
Learning outcomes Upon finishing of the course student is able to <ol style="list-style-type: none"> 1. demonstrate broad knowledge of environmental quality control methods among optical, spectrometric, electrochemical and chromatographic methods. 2. develop and critically evaluate analytical method independently. 			
Syllabus <i>Theoretical instruction-</i> Selection of analytical procedures and analytical methods development in the field of environmental analysis. <i>Practical instruction-</i> Development of the method validation plan.			
Literature Internal lecture material, E-material developed within ERASMUS+ NETCHEM project: GC/MS Method validation plan (I. Ivančev-Tumbas), Matrix interferences in the flame atomic absorption spectrophotometry (S. Maletić, I. Ivančev-Tumbas) and Method optimisation for analysis of anions by ion chromatography (S. Maletić i I. Ivančev-Tumbas), http://mdl.netchem.ac.rs/course/view.php?id=25 Standard methods for environmental analysis Additional literature: <ol style="list-style-type: none"> 1. M. Csuros Environmental Sampling and Analysis Lab Manual, Lewis Publishers, 1994. 2. H. Small: Ion Chromatography, Plenum Press, New York and London, 1990. 3. Grob R.L. Modern Practice of Gas Chromatography, 4th edition, Wiley-Interscience, 2004 4. Loon J.C. Van Selected methods of Trace Metal Analysis, biological and environmental samples, Wiley-Interscience 1985. 5. Reemstma T., Jekel M.: Organic Pollutants in the Water Cycle, properties, occurrence, analysis and environmental relevance of polar compounds, WILEY-ICH, 2006. 6. Standard methods http://www.epa.gov/osw/hazard/testmethods/sw846/online/index.htm 4. Selected Applications notes 5. Selected scientific papers 6. A. Tubić (2019), TOC analysis of water, http://mdl.netchem.ac.rs/course/view.php?id=19 			
Weakly teaching load			Other:-
Lectures:5	Exercises:-	Other forms of teaching: -	Student research: 5
Teaching methodology Lectures, independent research work- seminar with literature search (internet and library sources), video files use (http://mdl.netchem.ac.rs/course/view.php?id=25), use of Cmap, research work related to analytical method validation that requires written report and consultations, selected remote lectures and exercises (http://netchem.ac.rs/remote-access).			
Grading method (maximal number of points 100)			
Pre-exam obligations	points	Final exam	points
Seminar	30	Written exam-report on independent research work	40
		Oral exam	30